UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,897	08/25/2003	Dmitrii Yu Stepanov	060898-0006-US	2333

24341	7590	06/27/2005

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EXAMINER
LAVARIAS, ARNEL C

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)
Office Action Summary		10/647,897	STEPANOV ET AL.
		Examiner	Art Unit
		Arnel C. Lavarias	2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*10/8/04, 12/12/03, 11/24/03, 8/25/03.*</u>

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>25 August 2003</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☒ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>*12/12/03*</u>.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

DETAILED ACTION

Response to Amendment

1.   The amendments to the specification in the preliminary amendment dated 11/24/03 are

acknowledged and accepted.

2.   The amendments to Claims 4-9, and 15 in the preliminary amendment dated 12/12/03

are acknowledged and accepted.

3.   The submission of the abstract for the disclosure on 10/8/04 is acknowledged and

accepted.

Priority

4.   Acknowledgment is made of applicant's claim for foreign priority based on an

application filed in Australia on 2/26/01. It is noted, however, that applicant has not filed

a certified copy of the PR3359 application as required by 35 U.S.C. 119(b).

Drawings

5.   The drawings were received on 8/25/03. These drawings are objected to for the

following reason(s) as set forth below.

6.   The drawings are objected to because of the following informalities:

Figure 8- the reference label 'v' does not appear to correspond to any particular feature in

the figure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

7.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. *The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided.* The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

8.   The abstract of the disclosure is objected to because of the following informalities:

Abstract, line 2- 'comprising' should read 'including'

Abstract, line 6- '?' should read 'κ'.

Correction is required. See MPEP § 608.01(b).

9.   The disclosure is objected to because of the following informalities:

Page 3, line 21- 'Figure 1 shows' should read 'Figures 1a-d show'

Page 3, line 26- 'Figure 3 shows' should read 'Figures 3a-d show'

Page 4, line 1- 'Figure 4 shows' should read 'Figures 4a-b show'

Page 4, line 3- 'Figure 5 shows' should read 'Figures 5a-d show'

Page 4, line 5- 'Figure 6 shows' should read 'Figures 6a-d show

Page 5, line 10- 'α' should read 'α_i'

Page 5, line 17- 'approprietly' should read 'appropriately'

Page 8, line 26- 'Figure 7' should read 'Figure 8'

Page 9, line 20- 'Figure 5' should read 'Figure 8'

Page 9, line 25- 'Figure 6' should read 'Figure 8'.

Appropriate correction is required.

Claim Objections

10.   Claim 3 is objected to because of the following informalities:

Claim 3- other than the variable 'N', none of the other variables in the recited equation

have been previously defined.

Appropriate correction is required.

Double Patenting

11.   The nonstatutory double patenting rejection is based on a judicially created doctrine
grounded in public policy (a policy reflected in the statute) so as to prevent the
unjustified or improper timewise extension of the "right to exclude" granted by a patent
and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d
1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed.
Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*,
422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163
USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used
to overcome an actual or provisional rejection based on a nonstatutory double patenting
ground provided the conflicting application or patent is shown to be commonly owned
with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal
disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37
CFR 3.73(b).

12.   Claims 1-9, 15 are provisionally rejected under the judicially created doctrine of

obviousness-type double patenting as being unpatentable over Claims 1-22 of copending

Application No. 10/472027 (U.S. Patent Application Publication US 2004/0146244 A1).

Although the conflicting claims are not identical, they are not patentably distinct from

each other because copending Application No. 10/427027 similarly discloses a method of

calculating a sampling function for fabricating a N-channel grating, the method

comprising the steps (See Claims 1-4, 10, 11) of forming a summation of N periodic

seeding functions each describing a refractive index variation, wherein each periodic

function includes a phase shift value with respect to the other functions, and wherein at

least one phase shift value is non-zero. Copending Application No. 10/472027

additionally discloses the summation of the N periodic functions comprises a Fourier

analysis (See Claim 12); the result of the Fourier analysis is expressed as

$$\sum_{l=1}^{N} \kappa e^{i[K_o z + \theta + (2l-N-1)\Delta \kappa z/2 + \phi_l]} = \kappa Q e^{i(K_o z + \theta + \Psi)}$$ (See Claim 13); the method further comprises

the step of determining a set of the phase shift values for which a maximum value of the

sampling function amplitude is minimized (See Claim 14); the method further comprises

the step of determining a set of the phase shift values for which a maximum difference

between a maximum and minimum value of the sampling function amplitude is

minimized (See Claim 15); the method further comprises the step of determining a set of

the phase shift values for which a mean-square-deviation in the sampling function is

minimized (See Claim 16); the step of determining the set of phase shift values comprises

direct scanning through all combinations, or conducting a variational analysis, or using

other forms of extremum search numerical techniques, or a simulated annealing Monte

Carlo approach (See Claim 17); the grating is multi-dimensional, and wherein the

periodic seeding functions are multi-dimensional (See Claim 20); a method for

fabricating a multi-channel grating comprising the step of calculating a sampling function

in accordance with a method as set forth above (See Claims 1-4, 10, 11); and a multi-

channel grating structure fabricated utilizing a method of fabrication as set forth above

(See Claims 1-4, 10, 11, 21).

This is a provisional obviousness-type double patenting rejection because the

conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

13.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form

the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
sale in this country, more than one year prior to the date of application for patent in the United States.
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
patent by another filed in the United States before the invention by the applicant for patent, except that an
international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
subsection of an application filed in the United States only if the international application designated the United
States and was published under Article 21(2) of such treaty in the English language.

14.   Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Bao et al. (J. Bao,

X. Zhang, K. Chen, W. Zhou, 'Spectra of dual overwritten fiber Bragg grating', Optics

Communications, vol. 188, February 1, 2001, pp. 31-39.).

Bao et al. discloses a method of calculating a sampling function for fabricating a N-

channel grating (See Sections 2-3; Figures 1-6; N=2), the method comprising the steps of

forming a summation of N periodic seeding functions each describing a refractive index

variation (See Sections 2.2, 3), wherein each periodic function includes a phase shift

value with respect to the other functions, and wherein at least one phase shift value is

non-zero (See in particular Section 3.2).

15.   Claims 1-2, 4, 7, 9 are rejected under 35 U.S.C. 102(e) as being anticipated by

Rothenberg et al. (U.S. Patent No. 6707967).

Rothenberg et al. discloses a method of calculating a sampling function for fabricating

a N-channel grating (See for example Figures 1, 3-12; col. 3, line 9-col. 18, line 17), the

method comprising the steps of forming a summation of N periodic seeding functions

each describing a refractive index variation (See col. 6, line 63-col. 9, line 14), wherein

each periodic function includes a phase shift value with respect to the other functions,

and wherein at least one phase shift value is non-zero (See col. 8, line 38-col. 9, line 14).

Rothenberg et al. further discloses the summation of the N periodic functions comprising

a Fourier analysis (See col. 7, lines 5-28); the step of determining a set of phase shift

values for which a maximum value of the sampling function amplitude is minimized,

such as by a simulated annealing Monte Carlo approach (See col. 18, line 18-col. 24, line

18); and a method for fabricating a multi-channel grating comprising the step of

calculating a sampling function in accordance with the above method as set forth in

Claim 1 (See for example Figures 1, 3-12; col. 3, line 9-col. 18, line 17).

Claim Rejections - 35 USC § 103

16.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
such that the subject matter as a whole would have been obvious at the time the invention was made to a person
having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
manner in which the invention was made.

17.   Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Rothenberg et al.

Rothenberg et al. discloses the invention as set forth above in Claims 1 and 9, except

for the multi-channel grating being fabricated utilizing one of photo-induced refractive

index changes in a photosensitive waveguide material, etching techniques, epitaxial

techniques, or developing techniques such as a photopolymerization process. However, it

is well known and conventional in the art to utilize such various techniques to produce

grating structures in waveguides and substrates, such techniques including photo-induced

refractive index changes in a photosensitive waveguide material (e.g. two-beam or phase

masking methods to a photosensitive fiber or waveguide), etching techniques (e.g.

chemical or ion beam etching of the gratings into a substrate), epitaxial techniques (e.g.

chemical deposition of refractive index layers onto a substrate), and developing

techniques such as a photopolymerization process (e.g. holographic methods for writing

and developing grating structures in photopolymer substrates). Thus, it would have been

obvious to one having ordinary skill in the art at the time the invention was made to have

the multi-channel grating be fabricated utilizing one of photo-induced refractive index

changes in a photosensitive waveguide material, etching techniques, epitaxial techniques,

or developing techniques such as a photopolymerization process, to provide flexibility in

fabricating gratings having particular properties, e.g. custom grating heights, depths,

periods, apodization.

Conclusion

18.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

A. V. Buryak, K. Y. Kolossovski, D. Y. Stepanov, 'Optimization of refractive index

sampling for multichannel fiber Bragg gratings', IEEE J. Quantum Electr., vol. 39, no. 1,

Jan. 2003, pp. 91-98.

Buryak et al. is being cited to provide additional background information regarding

the theoretical analysis and calculations needed for the claimed invention. It is noted that

Buryak et al. is not prior art against the instant application due to the 2/15/02 effective

filing date of the instant application.

19.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-

2315. The examiner can normally be reached on M-F 9:30 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free).

Arnel C. Lavarias
Patent Examiner
Group Art Unit 2872
6/21/05